

## Appendix E

## Alignment of tobamovirus coat protein sequences

1

TMV-OM SYSITTPSQFVFLSSAWADPIELINLCTNALGNQFQTQQARTVVQRQFSE  
 S34858 SYSITTPSQFVFLSSAWADPIELINLCTNALGNQFQTQQARTVVQRQFSE  
 S34857 SYSITTPSQFVFLSSAWADPIELINLCTNALGNQFQTQQARTVVQRQFSE  
 S34856 SYSITTPSQFVFLSSAWADPIELINLCTNALGNQFQTQQARTVVQRQFSE  
 TMV-ER SYNITTPSQFVFLSSAWADPIELINLCTNALGNQFQTQQARTVVQRQFSE  
 TMV-06 SYSITTPSHFVFLSSAWADPIELINLCTNALGNQFQTQQARTVVQRQFSE  
 TMV-vul SYSITTPSQFVFLSSAWADPIELINLCTNALGNQFQTQQARTVVQRQFSE  
 TMV-DA SYSITSPSQFVFLSSVWADPIELINLCTSSSLGNQFQTQQARTTVQQQFSE  
 ToMV-L SYSITSPSQFVFLSSVWADPIELINLCTNSLGNQFQTQQARTTVQQQFSE  
 ToMV-Kr SYTVSSANQLVYLGSVWADPLELQNLCTNSLGNQFQTQQARTTVQQQFSD  
 TMGMV PYTINSPSQFVYLSSAYADPVQLINLCTNALGNQFQTQQARTTVQQQFAD  
 TMV-OB PYTVTSPSQLVYFGSVWADPITFIDLCTVALGNQFQTQNRARTTVQQQFSD  
 PMMV AYTVSSANQLVYLGSVWADPLELQNLCTNSLGNQFQTQQARTTVQQQFSD  
 PKMMV PYTVSSPNQLVYFGSVWADPIALIDLCTVSLGNQFQTQNRARTTVQQQFSD  
 ORSV SYTITDPSKLAYLSSAWADPNLNLCTNSLGNQFQTQQARTTVQQQFAD  
 ORSV-F SYTITDPSKLAYLSSAWADPNLNLCTNSLGNQFQTQQARTTVQQQFAD  
 CR-TMV SYNITNPNQYQYFAAVWAEPI PMLNQCISALSQSYQTQAARDTVRQQFSN  
 TVCV SYNITNPNQYQYFAAVWAEPI PMLNQCMSALSQSYQTQAARDTVRQQFSN  
 RMV SYNITNSNQYQYFAAVWAEPT PMLNQCVSALSQSYQTQAGRDTVRRQFAN  
 HRMV.GER SYNITNSNQYQYFAAVWAEPT PMLNQCVSALSQSYQTQAGRDTVRRQFAN  
 HRMV.JAP SYNITNSNQYQYFAAVWAEPT PMLNQCVSALSQSYQTQAGRDTVRRQFAN  
 WASABI SYNITNSNQYQYFAAVWAEPI AMLNQCVSALSQSYQTQAARDTVRQQFSN  
 TMV-CG SYNITSSNQYQYFAAMWAEPT AMLNQCVSALSQSYQTQAARDTVRQQFSN  
 CRMV VYNITSSNQYQYFAAMWAEPT AMLNQCVSALSQSYQTQAARDTVRQQFSN  
 RMV-SH VYNITSSNQYQYFAAMWAEPT AMLNQCVSALSQSYQTQAARDTVRQQFSN  
 RMV-SH SYNITSSNQYQYFAAMWAEPT AMLNQCVSALSQSYQTQAARDTVRQQFSN  
 RMV-CAB SYNITSSNQYQYFAAMWAEPT AMLNQCVSALSQSYQTQAARDTVRQQFSN  
 CGMMV AYNPITPSKLIASFASYPVVRTLLNFLVASQGTAFQTQAGRDSFRESLSA  
 CGMMV-W AYNPITPSKLIASFASYPVVRTLLNFLVASQGTAFQTQAGRDSFRESLSA  
 C-CGMMV SYSTSGIRSLPAFAKSFYFPYDVYNLLVSAQGGALQTQNGKDILRESLTG  
 CFMMV SYSTSGIRSLPAYTKSFYFPYDVYNLLVSAQGGALQTQNGKDILRDSING  
 YCGMMV SYSISSFRSLPAYTKSFYFPYDVYNLLVSSQGGALQTQNGKDISRESLNG  
 KGMV SYSTSGIRSLPAFAKSFYFPYDVYNLLVSAQGGALQTQNGKDILRESLTG  
 ZGMV PYSTSGIRSLPAFAKSFYFPYDVYNLLITNQGAALQTQNGKDILRESLVG  
 SHMV AYSIPTPSQLVYFTENYADYIPFVNRLINARSNSFQTQSGRDELREILIK

50

TMV-OM VWKPSPQVTVRFPD-SD-FKVYRYNAVLDPLVTALLGAFDTRNRIIEVEN  
 S34858 VWKPSPQVTVRFPD-SD-FKVYRYNAVLDPLVTALLGAFDTRNRIIDVEN  
 S34857 VWKPSPQVTVRFPD-SD-FKVYRYNAVLDPLVTALLGAFDTRNRIIDVEN  
 S34856 VWKPSPQVTVRFPD-SD-FKVYRYNAVLDPLVTALLGAFDTRNRIIDVEN  
 TMV-ER VWKPSPQVTVRFPD-RD-FKVYRYNAVLDPLVTALLGAFDTRNRIIEVEN  
 TMV-06 VWKPSPQVTVRFPD-RD-FKVYRYNAVLDPLVTALLGAFDTRNRIIEVEN  
 TMV VWKPSPQVTVRFPD-SD-FKVYRYNAVLDPLVTALLGAFDTRNRIIEVEN  
 TMV-DA VWKFPQSTVRFPD-DV-YKVYRYNAVLDPLITALLGTFDTRNRIIEVEN  
 TOMV-L VWKFPQSTVRFPD-DV-YKVYRYNAVLDPLITALLGAFDTRNRIIEVEN  
 TOMV-KR VWKTIPTATVRFPD-TG-FKVFRYNAVLDPLVSALLGAFDTRNRIIEVEN  
 TMGMV AWKPVPSMTVRFPD-SD-FYVRYNSTLDPLITALLNSFDTRNRIIEVDN  
 TMV-OB LFKTVPTRTNRFNDGENGFVFRYNSTLDPLISALMNSFDTRNRIIEVDN  
 PMMV VWKTIPTATVRFPD-TG-FKVFRYNAVLDPLVSALLGAFDTRNRIIEVEN  
 PKMMV LFKTVPTRTIRFSDGENGFVFRYNSTLDPLITALLNSFDTRNRIIETEN  
 ORSV VWQPVPTLTSRFPAGAGYFRVRYDPILDPLITFLMGTFDTRNRIIEVEN  
 ORSV-F VWQPVPTLASRFPAGAGYFRDYRDPIILDPLITFLMGTFDTRNRIIEVEN  
 CR-TMV LLSAVVAPSQRFPD-TG-SRVYVNSAVIKPLYEALMKSFDTRNRIIETEE  
 TVCV LLSAVVTPSQRFPD-TG-SRVYVNSAVIKPLYEALMKSFDTRNRIIETEE

AAB08579 LLSTIVAPNQRFDP-TG-FRVYVNSAVIKPLYEALMKSFDTRNRIIETEE  
 HRMV.GER LLSTIVAPNQRFDP-TG-FRVYVNSAVIKPLYEALMKSFDTRNRIIQTEE  
 HRMV.JAP LLSTIVAPNQRFDP-TG-FRVYVNSAVIKPLYEALMKSFDTRNRIIETEE  
 WASABI LLSAIVTPNQRFPE-TG-YRVYVNSAVLKPLYEALMKSFDTRNRIIETEE  
 TMV-CG LLSAIVTPNQRFDP-TG-YRVFINSAVLKPLYESLMKSFDTRNRIIETEE  
 CRMV LLSAIVTPNQRFPE-AG-YRVYINSAVLKPLYESLMKSFDTRNRIIETEE  
 RMV-SH LLSAIVTPNQRFPE-TG-YRVYINSAVLKPLYESLMKSFDTRNRIIETEE  
 AAD56047 LLSAIVTPNQRFPE-TG-YRMYINSAVLKPLYESLMKSFDTRNRIIETEE  
 AAD20292 LLSAIVTPNQRFPE-SG-YRVYINSAVLKPLYEALMKSFDTRNRIIETEE  
 CGMMV LPSSVVDINSRFPD-AG-FYAFLNGPVLRP FVSLSSDTRNRVIEVVD  
 CGMMV-W LPSSVVDINSRFPD-AG-FYAFLNGPVLRP FVSLSSDTRNRVIEVVD  
 C-CGMMV LLTSVASLNSRFPD-NE-FFVWSRESRIAAIIDSLLSALDSRNRAIEVEN  
 CFMMV LLTTVASPRSRFPD-EG-FFVWSRESRIAAIIDSLLSALDSRNRAIEVEN  
 YCGMMV LLTSVASPKSRFPD-GE-AFVWSRESRIAAIIDSLLSALDSRNRAIEVEN  
 KGMV LLTSVASLNSRFPD-NE-FFVWSRESRIAAIIDSLLSALDSRNRAIEVEN  
 ZGMV LLSSVASPTSQFPS-GV-FYVWSRESRIAAIIDS LFGALDSRNRAIEVEN  
 SHMV SQSVSVSPISRFPDPAEPD-YYIYLRDPSISTVYTALLQSTDTRNRVIEVEN

100

TMV-OM QANPTTAETLDATRRVDDATVAIRSAINNLVVELIRGTGSYNRSSFESS  
 S34858 QANPTTAETLDATRRVDDATVAIRSAINNLVVELIRGTGSYNRSSFESSY  
 S34857 QANPTTAETLDATRRVDDATVAIRSAINNLVVELIRGTGSYNRSSFESS  
 S34856 QANPMTAETLDATRRVDDATVAIRSAINNLVVELIRGTGSYNRSSFESS  
 TMV-ER QANPTTAETLDATRRVDDATVAIRSAINNLVVELIRGTGSYNRSSFESS  
 TMV-06 QANPTTAETLDATRRVDDATVAIRSAINNLMVELIRGTGSYNRSSFESS  
 TMV QANPTTAETLDATRRVDDATVAIRSAINNLVVELIRGTGSYNRSSFESS  
 TMV-DA QQSPTTAETLDATRRVDDATVAIRSAINNLVVELIRGTGLYNQNTFESMS  
 TOMV-L QQSPTTAETLDATRRVDDATVAIRSAINNLVVELIRGTGLYNQNTFESMS  
 TOMV-KR PQNPPTTAETLDATRRVDDATVAIRASISNLMNELVRGTGMYNQALFESAS  
 TMGMV QPAPNTTEIVNATQRVDDATVAIRASINNLVVELIRGTGMFNQAGFETAS  
 TMV-OB PANPNTSEVASATQRVDDATVNIRACINNLVVELIRGTGMNNTASFETVS  
 PMMV PQNPPTTAETLDATRRVDDATVAIRASISNLMNELVRGTGMYNQALFESAS  
 PKMMV PANPNTAEIASATQRVDDATVSIRACINNLVVELIRGTGMNNTASFETIS  
 ORSV PQNPPTTETLDATRRVDDATVAIRSAINNLLNELVRGTGMYNQVSFETIS  
 ORSV-F PQNPPTTETLDATRRVDDATVAIRSAINNLLNELVRGTGMYNQVSFETMS  
 CR-TMV ESRPSASEVNATQRVDDATVSIQSIIQLLLSELSSGHGYMNRAEFEL-  
 TVCV ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGYMNRAEFEL-  
 AAB0857 9 ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGYMNRAEFEL-  
 HRMV.GER QSRPSASQVANATQRVDDATVAIRSIIQLLLSELSSGHGYMNRAEFEL-  
 HRMV.JAP ESRPSASQVADATQRVDDATVAIRSIIQLLLSELSSGHGYMDRAQFEAI-  
 WASABI ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGLMNRAEFEL-  
 TMV-CG ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGLMNRAEFEL-  
 CRMV ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGLMNRAEFEL-  
 RMV-SH ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGLMNRAEFEL-  
 AAD56047 ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGLMNRAEFEL-  
 AAD20292 ESRPSASEVNATQRVDDATVAIRSIIQLLLSELSSGHGLMNRAEFEL-  
 CGMMV PSNPPTAESLNAVKTDDASTAARAEIDNLIIESISKGFVDYDRASFEEAF  
 CGMMV-W PSNPPTAESLNAVKTDDASTAARAEIDNLIIESISKGFVDYDRASFEEAF  
 C-CGMMV PSNPSTGEALNATKRNDASTAAHNDIPLLLAALNDGVGVFDSASFESAF  
 CFMMV PSNPSTGEALNATKRNDASTAAHNDIPLLI SALNDGAGVFDASFESQF  
 YCGMMV PSNPSTGEALNATKRNDASTAAHNDIPLLLAALNDGVGVFDSASFESAF  
 KGMV PSNPSTGEALNATKRNDASTAAHNDIPLLLAALNDGVGVFDSASFESAF  
 ZGMV PSNPSTGEALNAVKTDDASTAARAEIDNLIIESISKGFVDYDRASFEEAF  
 SHMV STNVTTAEQLNAVRRDDASTAIHNNLEQLLSLLTNGTGVFNRTSFESAS

150

TMV-OM GLVWNSGPA  
 S34858 GLVWTS GPA  
 S34857 GLVWTS GPA  
 S34856 GLVWTS GPA

TMV-ER	GLVWTSGPA
TMV-06	GLVWTSGPA
TMV	GLVWTSGPA
TMV-DA	GLVWTSAPA
TOMV-L	GLVWTSAPA
TOMV-KR	GLTWATTP?
TMGMV	GLVWTTTPA
TMV-OB	NLTWTTTTT
PMMV	GLTWATTP?
PKMMV	NLTWTTAAT
ORSV	GLTWTSS??
ORSV-F	GLTWTSS??
CR-TMV	-VPWTTAAA
TVCV	-LPWTTAPA
AAB0857	-LPWTTAPA
HRMV.GER	-LPWTTAPA
HRMV.JAP	-LPWTTAPA
WASABI	-IPWATAPA
TMV-CG	-LPWTTAPA
CRMV	-LPWATAPA
RMV-SH	-LPWATAPA
AAD56047	-LPWATAPA
AAD20292	-LPWTTAPA
CGMMV	SVVWSEATT
CGMMV-W	SVVWSEATT
C-CGMMV	GLTWTASAT
CFMMV	GLVWTAASS
YCGMMV	GLTWTASSS
KGMV	GLTWTASAT
ZGMV	GLVWTAGSS
SHMV	GLTWLVTTT

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